Earthgrains Baking Companies, Inc.
3475 South 300 West
Salt Lake City, UT 84115

October 12, 2012

Public Comment
Division of Air Quality
PO Box 144820
Salt Lake City, UT 84114-4820

Re: Public Comments Regarding Draft Rule R307-334. Emission Standards: Baking Ovens

To Whom it May Concern:

Earthgrains Baking Companies, Inc. (Earthgrains) presented comments to the Utah Department of Air Quality (UDAQ – Joel Karmazyn) on July 27, 2012 regarding the $PM_{2.5}$ state implementation plan (SIP) development process for draft rule R307-334. Emission Standards: Baking Ovens. The VOC emissions from a bakery which constitute mainly ethanol from the fermentation process are the subject of the draft regulation. Earthgrains is now submitting official public comments to ensure that our concerns are available to all parties making decisions with respect to the rule development process.

Through $PM_{2.5}$ ambient monitoring and the evaluation of the data, UDAQ has characterized Utah's $PM_{2.5}$ as secondary aerosol particles. The emissions of precursors to $PM_{2.5}$ such as $NO_X$, $SO_2$ and, to a lesser extent, VOC, provide compounds that react with other compounds in the atmosphere to produce $PM_{2.5}$. The Earthgrains bakery lies within the Salt Lake City $PM_{2.5}$ nonattainment area, which is one of three areas for which the UDAQ must develop a SIP that will bring the areas into compliance with federal standards. UDAQ is in the process of evaluating draft regulations for control of directly-emitted $PM_{2.5}$ and precursors. The potential draft regulation R307-334 would require Earthgrains and other local bakeries to reduce VOC emissions by 90%. Comments are presented below:

1. Earthgrains has conducted initial studies to determine the cost of installing VOC controls required under the draft rule. Under the assumption that all VOC emitted becomes $PM_{2.5}$, the cost of $PM_{2.5}$ reduction at the maximum potential emission rate is $8,342 per ton of VOC for Earthgrains. When the actual VOC emission rate is used, the calculated cost is $9,735 per ton of VOC reduced. These values are greater than the $5,000 per ton

value which is used to determine when a BACT control is considered economically feasible/infeasible.

The reactions that produce $PM_{2.5}$ from precursors are complex, as recognized by UDAQ. While models can predict the potential $PM_{2.5}$ generated from the bakery VOC emissions, the actual amount of $PM_{2.5}$ related to VOCs is unknown. The cost per ton of reduced VOC is not a direct correlation to the cost per ton of $PM_{2.5}$ reduced. The amount of $PM_{2.5}$ reduced is likely to be 1/10 or less than the total VOC reduced, increasing the cost of a ton of reductions by a factor of 10 (to $83,420 or $97,350 per ton). Therefore, reducing VOC for the purpose of $PM_{2.5}$ reduction is not economically feasible.

2. Earthgrains obtained a sample BACT analysis calculation from Mr. Karmazyn that was conducted for Pepperidge Farms. These values appear to be incorrect since the equation to allocate installation cost is improperly represented as $B = PV \{i / [1 - (1 + i) - n]\}$. The correct equation is $B = PV \{i / [1 - (1 + i)^{-n}]\}$. Since B was calculated as a negative number on the Economic Impact Analysis in this case, the total cost was underreported at $225/ton. The actual cost should be $330/ton, assuming that the calculation of 650 tons of VOC reduction is correct. Based on Earthgrains' experience with multiple bakery locations, typical actual emissions for bakeries with multiple lines and no control range up to 100 or 150 tons/year. An actual or potential reduction of 650 tons/year seems inflated.

3. Mr. Karmazyn indicated that ethanol from bakeries is primarily being considered for $PM_{2.5}$ reduction because the Control Technique Guideline (CTG) document admits that ethanol is moderately reactive. The Alternative Control Technology (ACT) Document for Bakery Oven Emissions mentions a previous study listing bakeries as sources of "Reactive Volatile Organic Gases," but this hardly translates to ethanol being moderately reactive to form $PM_{2.5}$. Additionally, the document classifies ethanol as one of the "precursors to the formation of ambient ozone." Neither of these statements implies that ethanol will form particulates (or $PM_{2.5}$) by reaction.

   The above document was created over a decade ago and has not been revised since. The more recent research and studies that focus on $PM_{2.5}$ formation use models that do not include ethanol in the chemical mechanisms used for transport modeling of particulate matter formation and dynamics (CAMx, CMAQ, etc.). The reaction products of ethanol are too small and too volatile to form particulates. To achieve attainment, the UDAQ is counting on reductions in VOC from bakeries to result in

reductions in $PM_{2.5}$, however, the actual results will not agree with the predictions.[1]

4. Bakeries will likely install catalytic oxidizers to control VOC. These units use natural gas to increase the temperature of the exhaust air to catalyze VOCs. Increases in natural gas combustion at these sources will increase the emissions of $PM_{2.5}$ directly and $NO_X$ and $SO_2$, which have been demonstrated to contribute to $PM_{2.5}$ formation, thereby diminishing the value of the VOC reduction. UDAQ's data indicates that $NO_X$ is the most prevalent precursor; therefore additional $NO_X$ emissions should be avoided. Since $NO_X$ contributes to the development of $PM_{2.5}$ more readily than VOC (ethanol in particular), additional $NO_X$ emissions will translate to more $PM_{2.5}$ emissions.

5. The deadline of January 1, 2014 is only a little over a year away. The selection, ordering and installation of catalytic oxidizers involves a significant amount of time and the rule hasn't yet been finalized. Additionally, sources won't be able to finalize equipment purchases until Approval Orders have been received from the State. Mr. Karmazyn assured Earthgrains that the State will work with industries to make sure that enforcement is not undertaken for sources that have plans in place to install control, but the rule doesn't outline this option.

6. "Bakery Yeast" is listed under "Evaporative loss; Waste management practices" in the State's *$PM_{2.5}$ Emission Inventory Preparation Plan*. The fermentation of yeast is neither an evaporative loss source nor a waste management practice.

7. A memorandum from Mr. Karmazyn to the Air Quality Board dated August 20, 2012 identified the four (4) sources that will be subject to this rule. In addition to Pepperidge Farm, which has been intimately involved in the rulemaking process, Earthgrains and two (2) Interstate Brands Companies facilities will be required to install controls. Pepperidge Farm has committed to becoming a synthetic minor source and none of the other three have Title V operating permits. The following table shows reported emissions from the four facilities from the UDAQ web site.

[1] Correspondence with Dr. Jay Turner, Washington University, St. Louis MO, July 26, 2012.

| Facility | 2005 VOC Emissions (tons) | 2008 VOC Emissions (tons) |
|---|---|---|
| Pepperidge Farm | 120.46 | 150.20 |
| Earthgrains (formerly Metz) | 68.94 | 80.47 |
| IBC – Salt Lake | 56.93 | 3.14 |
| IBC – Ogden | 44.52 | 3.15 |

None of these facilities have excessive emissions, and with the controls being installed at Pepperidge Farms, a majority of the emissions will be removed from the atmosphere. If all 2008 reported emissions were controlled at 90%, there would be a reduction of 213.26 tons per year VOC, which would likely reduce $PM_{2.5}$ by 21 tons per year or less, hardly a substantial reduction for the cost of greater than $1,000,000 per facility ($18,756 per ton – install cost only).

In conclusion, Earthgrains proposes that controlling VOC emissions at bakeries will not significantly impact $PM_{2.5}$ concentrations in the Salt Lake City nonattainment area. Based on our review, the evaluation of the economic feasibility of controlling VOC (mainly ethanol) from the baking process was flawed and underestimates the cost per ton of pollutant removed associated with the installation of an oxidizer. In addition, the science involved in $PM_{2.5}$ formation does not support the assumption that the reduction of ethanol emissions will yield a related reduction in $PM_{2.5}$ in the atmosphere. Please provide more scientific information implicating ethanol in the formation of $PM_{2.5}$ in the Salt Lake City area or discontinue further efforts to regulate bakery VOC emissions in order to affect $PM_{2.5}$ reductions.

Earthgrains regrets that we were unaware of the stakeholder work group's efforts which resulted in a lack of involvement in the process leading to this draft rule. We have substantial experience in characterizing emissions and controlling VOC from our bakeries across the country and could have added significant insight during the development activities. We appreciate the opportunity to provide our comments at this stage in the rulemaking and offer our thanks to UDAQ and the Air Quality Board for their consideration of our concerns.

Please contact me at 801-487-4677 with any questions regarding the information provided.

Sincerely,

EARTHGRAINS BAKING COMPANIES, INC.

FOR JOE ROBINSON

Joe Robinson
Plant Manager